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Metabolic Diseases in Sheep

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Cases of metabolic diseases in sheep occur over a period of about 6 weeks after lambing and are associated with flushes of grass. It is thought that with such flushes, the dry matter content of herbage falls and as a result there is insufficient magnesium and/or calcium to meet the heavy demands of the lactating ewe.

Data of disease occurence were available from Drs C B Ollerenshaw (Weybridge) and D T Michael (Denbighshire) in relation to a large sample of Denbighshire ewes in the years 1957-1968.

Method

It was assumed that a flush of quickly growing grass was most likely to occur when:-

(a) Soil temperatures were adequate (over 43°F at 1 ft).

(b) Soil moisture was plentiful (less than 0.5 in. soil moisture deficit in the top 6 inches of soil).

(c) Sunshine was abundant (over 8 hours per day).

(d) Air temperature was high.

It was difficult to get representative data for the county of Denbighshire, especially in the earlier years before a sunshine recorder was installed at Ruthin. Even so, prolonged sunshine and soil temperature were likely to be fairly homogeneous on a macro scale, and a more serious source of error in regard to meteorological data was the incidence of rainfall. The actual amount of rain which fell before 2, 3 or 4 sunny days was critical in the provision of adequate moisture in the top spit of soil occupied by most of the grass roots. For example 0.5 in. of rain would provide adequate moisture for up to 5 days of "flush"; less than this amount would curtail the duration of quick growing conditions, due to exhaustion of easily available soil moisture. Nevertheless an attempt was made to assign a "flush rating" using sample rain and sunshine data, as follows:-

When 1 ft soil temperature was over 45°F at Wrexham (and hence over 43°F over the Denbigh hills) until the first week of June, the individual days of high sunshine and low soil moisture deficit contributed to the rating by the following quotient -

/Multiply

G 04221/VT/1/70/60

Multiply excess sun hours over 8.0 by Sun power factor ranging from 1.0 in early April to 1.6 in early June, and by a temperature factor, ranging from 1.0 below a Wrexham maximum of 55°F to 1.4 over 70°F.

Results

			Reported Disease incidence per 20,000 ewes		
High ratings	1959	55.8		492	Correct
Above average	1962	39.4		287	Correct
	1968	37.8		230	Correct
	1965	37.4		183	
	1958	35.9		445	
Below average	1960	28.0		170	Correct
	1957	24.2		151	Correct
	1964	21.6		181	Correct
Low	1961	11.4		103	Correct
	1966	10.5		135	Correct
	1963	3.0		167	

Thus 8 out of 11 years were correctly related to disease incidence. Two (1965 and 1963) were only slightly incorrect and only one, 1958, was badly astray.

Considering the inadequate nature of the weather sampling this relationship is thought to be very satisfactory.

Application

It is clearly difficult to devise any forecasting system which would predict the correct amounts of rain followed by days of good sunshine.

Even so, if the significant weather has been correctly identified in this manner, it should be possible to take local action as and when the weather occurs.

For example 1959 had three consecutive sunny days on May 23, 24 and 25th with a total of 38.6 hours bright sunshine following over $\frac{1}{2}$ inch of rain on the 20 and 21st. 1958 had also three consecutive days May 26, 27, 28th with a total of 35.6 hours, following over $\frac{1}{2}$ inch of rain on the 22 and 23rd.

Any comments or suggestions on this paper should be referred to the author.

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G. 04221/VT/1/70/60